ERAGROSTIS MEXICANA, E. NEOMEXICANA, E. ORCUTTIANA, AND E. VIRESCENS: THE RESOLUTION OF A TAXONOMIC PROBLEM

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Abstract

Eragrostis mexicana, *E. neomexicana*, *E. orcuttiana*, and *E. virescens* are united into a single species, *E. mexicana*, which is divided into subsp. *mexicana* and subsp. *virescens*. The last is a new combination.

Among the American species of *Eragrostis*, there is a group of four closely related species distinguished from the rest of the genus by an annual, weedy habit, a chromosome number of $2n = 60$, flowers with three stamens, and caryopses which are rectangularly prismatic, flat to prominently sulcate dorsally, and dark brown and reticulate on the surface. These species are *E. mexicana* (Hornem.) Link (including *E. limbata* Fourn.), *E. neomexicana* Vasey, *E. orcuttiana* Vasey, and *E. virescens* Presl.

Together, these four species are distributed contiguously from the southwestern United States, through Central America and western South America, to Argentina and Chile. *E. mexicana* and *E. neomexicana* have coincident distributions from southeastern California to Texas and south through Mexico, Central America, and northern South America. *E. orcuttiana* is restricted to California and adjacent parts of Nevada, and *E. virescens* is found on the eastern and western slopes of the Andes, from the equator to central Argentina and Chile, and in Uruguay, adjacent Argentina, and southeastern Brazil. In addition, all four species have been introduced at scattered locations around the world, but apparently they do not persist.

Judging from the number of misidentified specimens in herbaria these species have been a persistent source of taxonomic difficulty. This is especially true of *E. mexicana* and *E. neomexicana* in the southwestern United States and Mexico, and of *E. neomexicana* and *E. virescens* in northern South America. These difficulties have led to varying taxonomic treatments of *E. mexicana* and *E. neomexicana*.

Hitchcock (1950) and Harvey (1948), among others, regard them as distinct species, but McVaugh (1983), Beetle (1977), and Harvey (1975) unite them. *E. virescens* and *E. orcuttiana* have always been considered distinct from each other and from *E. mexicana* and *E. neomexicana*.

In order to clarify the status of these species and their relationships, the group was recently subjected to a detailed study (Sánchez 1979) that showed that all four species are best united under *E. mexicana*, with *E. mexicana* and *E. neomexicana* constituting one subspecies, and *E. orcuttiana* and *E. virescens* another. The objective of the present paper is to present a brief summary of the results and to make available the new combination they require. A more detailed version, in Spanish, is in preparation.

Eragrostis mexicana (Hornem.) Link

Caespitose annuals, 10-130 cm tall. Culms sometimes with a ring of glandular depressions beneath the nodes, these sometimes coalescing to form a continuous band. Leaf sheaths with or without glandular depressions on the principal and sometimes secondary nerves, papillose-pilose along the upper margins. Leaf blades 5-25 cm long, 3-7 mm wide, occasionally pilose below toward the base, rarely with glands on the abaxial side of the midrib. Inflorescence an open panicle (5-)10-40 cm long, 2-18 cm wide, sometimes with glandular depressions beneath the nodes and on the branches and pedicels. Pedicels divergent, scabrous, longer or shorter than the spikelets. Spikelets ovate to linear in outline, grey-green to purple, 4.0-9.5 mm long, 0.7-2.4 mm wide, with 5-13(-15) florets; rachillas persistent at maturity. Glumes deciduous at maturity, lanceolate, subequal, the lower 0.7-2.0(-2.3) mm long, the upper slightly longer. Lemmas ovate, acute, deciduous at maturity, glabrous or occasionally with a few hairs, 1.2-2.5 mm long. Paleas slightly shorter than the lemmas, persistent at maturity. Stamens 3; anthers purple, 0.2-0.4 mm long. Caryopses 0.5-1.0 mm long, dark brown, reticulate, ovoid to rectangular-prismatic, laterally compressed, shallowly to deeply sulcate on the dorsal side. Chromosome number $2n = 60$.

Habitat: Recently disturbed sites and cultivated fields in temperate semiarid zones.

Key to Subspecies

Spikelets ovate to oblong in outline, more than 1.4 mm wide; lower glume 1.2-2.3 mm long; sum of spikelet width and lower glume length 2.6-4.7 mm.....subsp. *mexicana*

Spikelets linear to linear-lanceolate, less than 1.5 mm wide; lower glume 0.7-1.7 mm long; sum of spikelet width and lower glume length 1.4-3.2 mm.....subsp. *virescens*

Eragrostis mexicana (Hornem.) Link subsp. *mexicana*

Poa mexicana Hornemann, Hort. Hafn. 2:953. 1815. Type unknown. Harvey (1948) considered specimens in MA grown from seed sent by Sessé and Mociño as typical.

Eragrostis mexicana (Hornem.) Link, Hort. Berol. 1:190. 1827.

Eragrostis limbata Fournier, Mex. Pl. 2:116. 1886.

Eragrostis neomexicana Vasey. Contr. U.S. Natl. Herb. 2:542. 1894. TYPE: U.S.A.: New Mexico: Organ Mountains, in 1881, G.R. *Vasey s.n.* (lectotype [here designated]: U.S. Natl. Herb. no. 1761631, US!; isolectotypes: U.S. Natl. Herb. no. 822049 and 909912, US!).

Plants frequently with glandular depressions on the culms, leaf sheaths and blades, and axis, branches and pedicels of the panicle. Otherwise differing from subsp. *virescens* by the characters used in the key.

Distribution: From southeastern California to Texas and south through Mexico, Central and South America to approximately the equator; absent from the Amazon Basin.

The two elements that constitute this subspecies have been separated on the basis of spikelet color, plant height, and the presence or absence of glandular depressions beneath the culm nodes. *E. mexicana* consists of small (15-50 cm tall), eglandular plants with purple spikelets, and *E. neomexicana* comprises robust plants (75-120 cm tall) with grey-green spikelets and glands beneath the culm nodes and sometimes elsewhere. Examination of more than 1000 herbarium specimens demonstrated continuous variation in all these characters, although plants with purple spikelets tended to be smaller than those with grey-green spikelets.

On the other hand, it was found to be relatively easy to classify populations in the field: they consisted of either small plants with purple spikelets (*E. mexicana*) or larger plants with grey-green spikelets (*E. neomexicana*). However, it was also observed that the populations of small plants with purple spikelets were growing on poor sites with hard, compact soils, while those of larger plants with grey-green spikelets grew mainly in cultivated fields. This suggests that the two phenotypes are responses to different ecological situations. This was borne out by growing in the greenhouse plants from seed from both types of parents. All produced robust plants with grey-green or purple-tinged spikelets.

A search for other characters which would be useful in separating *E. mexicana* and *E. neomexicana* proved futile.

Eragrostis mexicana subsp. *virescens* (Presl) S.D. Koch *et* I. Sánchez V., *comb. nov.* Based on *E. virescens* Presl.

Eragrostis virescens Presl, Reliq. Haenk. 1:276. 1830. TYPE: Chile, *Haenke s.n.* (holotype: PR; fragments: US!).

Eragrostis orcuttiana Vasey, Contr. U.S. Natl. Herb. 1:269. 1893. TYPE: U.S.A. California: Chollus Valley, San Diego, Aug. 1885, *Orcutt 1313* (holotype: U.S. Natl. Herb. no. 1761633, US!)

Plants with glandular depressions absent or beneath the culm nodes only. Otherwise differing from subsp. *mexicana* by the characters mentioned in the key.

Distribution: In North America, restricted to California and adjacent counties of Nevada; in South America, along the western slopes of the Andes from Ecuador to Chile, in the Andean regions of Bolivia and Argentina, and in southeastern Brazil, Uruguay and adjacent Argentina.

E. orcuttiana and *E. virescens* have rarely been compared because of their widely disjunct distributions. The character used by Harvey (1948) to distinguish them, spikelets with more or fewer than eight florets was found to be ineffective since floret number varied between 5 and 12 in both areas. A search for other differences correlated with the different geographical areas gave negative results.

The most outstanding characteristic of this subspecies is its distribution, which conforms to a well-known pattern of disjunction between South America and California (e.g., Raven 1972). In this case it is believed that the Californian element probably resulted from introduction from South America by man, probably in Spanish colonial times.

This subspecies and subsp. *mexicana* intergrade in their area of contact in northern South America (but not in the contact zone in North America). This makes their separation some what arbitrary in this region, and it is one reason these two taxa are relegated to the category of subspecies.

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